



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,447	04/07/2004	Chung J. Lee	DSI 313CON	7180
50488	7590	03/02/2006	EXAMINER	
ALLEMAN HALL MCCOY RUSSELL & TUTTLE LLP			ZERVIGON, RUDY	
806 SW BROADWAY			ART UNIT	
SUITE 600			PAPER NUMBER	
PORTLAND, OR 97205-3335			1763	

DATE MAILED: 03/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/820,447

Applicant(s)

LEE ET AL.

Examiner

Rudy Zervigon

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 19 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1/19/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-18, drawn to a process module (Figure 8; column 6, lines 11-65), classified in class 118, subclass 715.
 - II. Claims 19 and 20, drawn to a method for cleaning, classified in class 134, subclass 1.3.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case, the apparatus as claimed can be used to practice another and materially different process, for example an etching process classified in 156/345+.
3. Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.
4. Because these inventions are independent or distinct for the reasons given above and the inventions require a different field of search (see MPEP § 808.02), restriction for examination purposes as indicated is proper.
5. During a telephone conversation with Matt Hall on January 23, 2006 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-18.

Art Unit: 1763

Affirmation of this election must be made by applicant in replying to this Office action. Claims 19 and 20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Drawings

6. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "reactor cleaning subsystem" must be shown or the feature canceled from the claims. No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Double Patenting

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. Claims 1-18 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-54 of copending Application No. 10/897,797 in view of Gomi (USPat. 6,130,171). Copending Application No.

Art Unit: 1763

10/897,797 does not claim reactor components as claimed in the present application. Gomi is discussed below.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Gomi's apparatus components for processing the specific precursors of Copending Application No. 10/897,797.

Motivation to to use Gomi's apparatus components for processing the specific precursors of Copending Application No. 10/897,797 is for creating polymer layers on wafers as taught by Gomi (column 2; lines 39-42).

This is a provisional obviousness-type double patenting rejection.

9. Claims 1-18 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-38 of copending Application No. 10/900,878 in view of Gomi (USPat. 6,130,171). Copending Application No. 10/900,878 does not claim reactor components as claimed in the present application. Gomi is discussed below.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Gomi's apparatus components for processing the specific precursors of Copending Application No. 10/900,878.

Motivation to to use Gomi's apparatus components for processing the specific precursors of Copending Application No. 10/900,878 is for creating polymer layers on wafers as taught by Gomi (column 2; lines 39-42).

This is a provisional obviousness-type double patenting rejection.

Claim Objections

10. Claim 7 is objected to because of the following informalities: requires “is maintains a temperature”. Appropriate correction is required.

Claim Rejections - 35 USC § 112

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claims 2, 4, 5, 7, 11, 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

13. Claims 2, 4, 5, 11 recite the limitation “modules”. There is insufficient antecedent basis for this limitation in the claim. Claim 1 requires “module”, singular.

14. Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: what comes after 300 mm in “...a 300 mm is in a range...”.

Claim Rejections - 35 USC § 102

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

16. Claims 1, 11, 12, 13, 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Gomi; Hideki (US 6130171 A). Gomi teaches a process module (Figure 8; column 6, lines 11-

Art Unit: 1763

65) for transport-polymerization ("TP") of a precursor (di-para-xylylene; column 6, line 17) comprising: (a) a material delivery subsystem (51; Figure 8; column 6, lines 11-65) adapted to deliver the precursor (di-para-xylylene; column 6, line 17) to a TP reactor (52; Figure 8; column 6, lines 11-65); (b) the TP reactor (52; Figure 8; column 6, lines 11-65) adapted to receive the precursor (di-para-xylylene; column 6, line 17) and to generate an intermediate ("monomer gas at 680°C"; column 6, lines 19); (c) a deposition chamber (53; Figure 8; column 6, lines 11-65) designed to produce a polymer film (column 6, lines 20-23) onto a substrate (54) under a vacuum (column 6, lines 66-67); and (d) one or more substrate (54) pre-/post-treatment chambers (55-57; Figure 8) designed to remove contamination from the substrate (54) and to stabilize the polymer film (column 6, lines 20-23) on the substrate (54) under the vacuum (column 6, lines 66-67), as claimed by claim 1

The identities of the gases discussed in claims 11 and 12 do not add structural limitations to the corresponding apparatus independent claims. Further, is well established that apparatus claims must be structurally distinguished from the prior art (In re Danley, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does ." (emphasis in original) Hewlett - Packard Co . v. Bausch & Lomb Inc ., 15 USPQ2d 1525, 1528 (Fed. Cir. 1990), MPEP – 2114). Further, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Exparte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

Gomi further teaches:

Art Unit: 1763

- i. The process module (Figure 8; column 6, lines 11-65) of claim 1, wherein the material delivery subsystem (51; Figure 8; column 6, lines 11-65) comprises: (a) a sample container (inherent) for holding the precursor (di-para-xylylene; column 6, line 17); (b) a heater to vaporize ("vaporizer heats the dimer"; column 6, line 16) the precursor (di-para-xylylene; column 6, line 17); and (c) a feed control component (flow control valves + 60, not labeled; Figure 8; column 6, lines 24-30) to regulate the flow rate of the vaporized precursor (di-para-xylylene; column 6, line 17), as claimed by claim 13
- ii. The process module (Figure 8; column 6, lines 11-65) of claim 13, wherein the feed control component (flow control valves + 60, not labeled; Figure 8; column 6, lines 24-30) comprises a liquid mass flow controller ("LMFC") or a vapor flow controller ("VFC"), as claimed by claim 16. Gomi shows a vapor flow controllers as flow control valves + 60, not labeled; Figure 8; column 6, lines 24-30. When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1763

18. Claims 2-4, 6, 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gomi; Hideki (US 6130171 A) in view of Dozoretz et al (USPat. 6,197,119). Gomi is discussed above.

Gomi does not teach:

- i. The process module (Figure 8; column 6, lines 11-65)s of claim 1, further comprising a pump cold-trap in fluid communication with the deposition chamber (53; Figure 8; column 6, lines 11-65) to prevent organic residuals from passing from the deposition chamber (53; Figure 8; column 6, lines 11-65) into a pump system (60; Figure 8), as claimed by claim 2
- ii. The process module (Figure 8; column 6, lines 11-65) of claim 2, wherein the cold trap is at a temperature below -50°C. during the precursor (di-para-xylylene; column 6, line 17) deposition, as claimed by claim 3
- iii. The process module (Figure 8; column 6, lines 11-65)s of claim 1, further comprising a pump system (60; Figure 8) in fluid communication with a pump cold-trap to provide the vacuum (column 6, lines 66-67) for the deposition chamber (53; Figure 8; column 6, lines 11-65), as claimed by claim 4
- iv. The process module (Figure 8; column 6, lines 11-65) of claim 1, further comprising a TP trap, interposing the TP reactor (52; Figure 8; column 6, lines 11-65) and the deposition chamber (53; Figure 8; column 6, lines 11-65), and adapted to confine undesirable chemicals generated in the TP reactor (52; Figure 8; column 6, lines 11-65), as claimed by claim 6

Art Unit: 1763

- v. The process module (Figure 8; column 6, lines 11-65) of claim 6, wherein the TP Trap comprises reactive metal turnings that are kept at a temperature ranging from 200°C. to 450°C, as claimed by claim 8
- vi. The process module (Figure 8; column 6, lines 11-65) of claim 6, wherein the TP Trap comprises reactive metal turnings that are kept at a temperature ranging from 300°C. to 350°C, as claimed by claim 9
- vii. The process module (Figure 8; column 6, lines 11-65) of claim 9, wherein the reactive metal turnings are copper or zinc, as claimed by claim 10

Dozoretz teaches a vapor deposition chamber (14; Figure 1; column 4, lines 23-44) including a vacuum pump ("to vacuum pump"; Figure 1; column 4, line 30) cold trap (10) with copper turnings (78; column 15, lines 5-15) in fluid communication with the deposition chamber to prevent organic residuals (TEOS, ethylene; column 2, lines 50-55) from passing from the deposition chamber into the pump system (column 2, lines 15-26).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Gomi to add Dozoretz's cold trap to Gomi's reactor (52), and deposition chamber (53), and at an intermediate location between Gomi's reactor and deposition chamber.

Motivation for Gomi to add Dozoretz's cold trap to Gomi's reactor (52), and deposition chamber (53), and at an intermediate location between Gomi's reactor and deposition chamber is for decreasing time, labor, and costs attributed to polymerized TEOS downstream of the reaction chamber (column 2, lines 15-20).

19. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gomi (USPat. 6,130,171) in view of Hirata et al (USPat. 6,265,495). Gomi is discussed above. Gomi

Art Unit: 1763

does not teach a sample container made of borosilicate glass, stainless steel, or ceramic quartz. Hirata teaches housing a precursor chemical in a sample container (103) made from stainless steel (column 20, lines 15-25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Gomi to use Hirata's precursor chemical sample container (103) made from stainless steel.

Motivation for Gomi to use Hirata's precursor chemical sample container (103) made from stainless steel is to provide corrosion resistance (column 20, lines 5-20).

20. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gomi (USPat. 6,130,171) in view of Paz de Araujo; Carlos A. et al. (US 6110531 A). Gomi is discussed above. Gomi does not teach:

- i. The process module (Figure 8; column 6, lines 11-65) of claim 16, wherein the LMFC delivers precursors (di-para-xylylene; column 6, line 17) at a rate in a range of 0.5 to 10 g/hour to a wafer, as claimed by claim 17
- ii. The process module (Figure 8; column 6, lines 11-65) of claim 17, wherein the rate of precursors (di-para-xylylene; column 6, line 17) delivery to a 200 mm wafer is in a range of 1.0 to 5 g/hour, and the rate of precursor (di-para-xylylene; column 6, line 17) delivery to a 300 mm is in a range of 2 to 10 g/hour, as claimed by claim 18

Paz de Araujo teaches a CVD apparatus (Figure 4) including LMFCs (110; Figure 4) feeding a vaporizer (182; Figure 4) under precise control (column 21, line 58 – column 22, line 14).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Gomi to add Paz de Araujo's LMFC(s) under optimal flow operation.

Art Unit: 1763

Motivation for Gomi to add Paz de Araujo's LMFC(s) under optimal flow operation is for controlling film stoichiometry during desposition as taught by Paz de Araujo (column 22; lines 10-15).

21. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gomi; Hideki (US 6130171 A) in view of Dozoretz et al (USPat. 6,197,119) and Sivaramakrishnam; Visweswaren et al. (US 5958510 A). Gomi and Dozoretz are discussed above. Gomi and Dozoretz do not teach Gomi's process module (Figure 8; column 6, lines 11-65) of claim 6, wherein Dozoretz's TP Trap (10) contains porous quartz and is maintains a temperature that is at least 10°C higher than a ceiling temperature (T_{cl}) of Gomi's reactive intermediates ("monomer gas at 680°C"; column 6, lines 19) that are generated from Gomi's TP Reactor (52; Figure 8; column 6, lines 11-65), as claimed by claim 7

Sivaramakrishnam teaches quartz material as a "non-reactive material" (column 7; lines 7-13).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Gomi and Dozoretz to use inert materials, such as quartz, as taught by Sivaramakrishnam.

Motivation for Gomi and Dozoretz to use inert materials, such as quartz, as taught by Sivaramakrishnam is for using process compliant materials as taught by Sivaramakrishnam (column 7; lines 7-13).

22. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gomi; Hideki (US 6130171 A) in view of Hara; Masaki et al. (US 5648276 A). Gomi is discussed above. Gomi does not teach the process module (Figure 8; column 6, lines 11-65) of claim 1, further comprising a reactor (52; Figure 8; column 6, lines 11-65) cleaning subsystem mounted to the TP

Art Unit: 1763

reactor (52; Figure 8; column 6, lines 11-65) to purge the reactor (52; Figure 8; column 6, lines 11-65) of organic residues.

Hara teaches CVD chambers (C₁-C₃; Figure 2) including reactor cleaning subsystems (pumping components including traps) for each reactor.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Gomi to add Hara's reactor cleaning subsystem.

Motivation for Gomi to add Hara's reactor cleaning subsystem is for maintaining a clean processing environment producing high quality wafers as taught by Hara (column 1, line 65 – column 2, line 5).

Conclusion

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

US 6475902 B1

US 6383257 B1

US 6319321 B1

US 6271498 B1

US 6238514 B1

US 6206970 B1

US 6136725 A

US 5944899 A

US 5777300 A

US 5730803 A

Art Unit: 1763

US 5709753 A

US 5648276 A

US 5567267 A

US 5556473 A

US 5536322 A

US 5536321 A

US 5536319 A

US 5536317 A

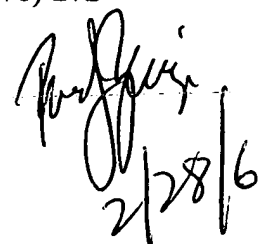
US 5534068 A

US 4823711 A

US 4683143 A

US 4518623 A

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (571) 273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.


2/28/6